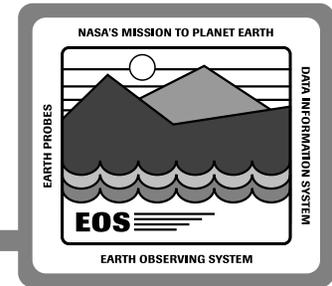


Interconnection Architecture

Carl Wheatley

13 - 14 December 1993

Technology Drivers

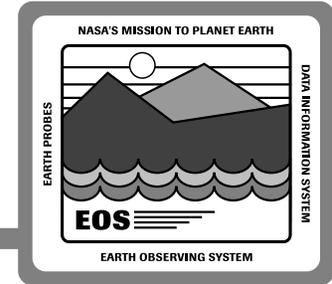


Based on Mandates and Interoperability/Interconnection Objectives

Synch. Interprocessing
Asynch. Messaging
Static Invocation
Explicit Static Binding
Implicit Static Binding
Directory Service Scalability
Naming Service
Security Service
Object Technology
Time Synchronization
Multivendor Interoperability
O/S Transparency

Event Processing/Maturity
Concurrency
Internationalized Security
Multiple Language Support
Legacy Server Integration
Dynamic Invocation
Dynamic Load Balancing
Request Brokering
Server Advertising/Scaling
Real-Time Collaboration
Trading
Federation Transparency

Technology Applications of Other Systems



Federated Service Advertising and Retrieval

- X/Open XFN, OMG Object Services, S2K Abstracts/Information Repository

Object and Event Processing Technology Maturation

- OMG Tech. Committee, OSF Liason, COSE/Unix, DME R1.0

Heritage Server Integration

- ANSA C-Lite (Ellery), Project Pilgram Client-Secretary, ODP

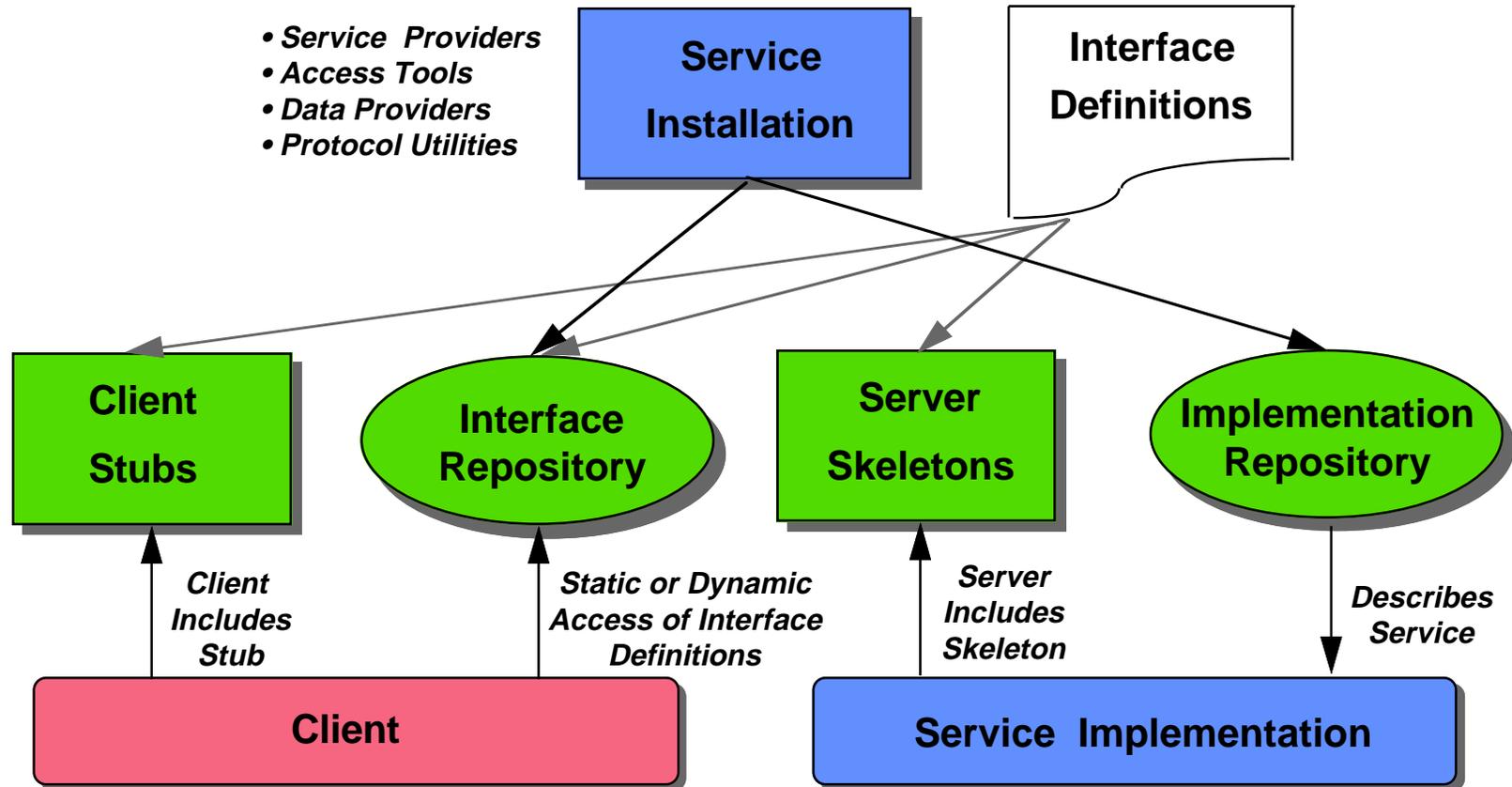
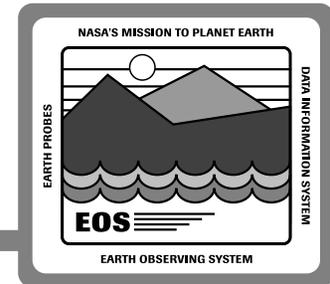
Real-Time Collaboration

- COSE DMS/DIME w/IMA, Research Systems IDL, S2K Protocols, Hollywood, and SPIMS, NIIT ATM integration, Internet Perf. Char. RFP

Federation Transparency and Trading

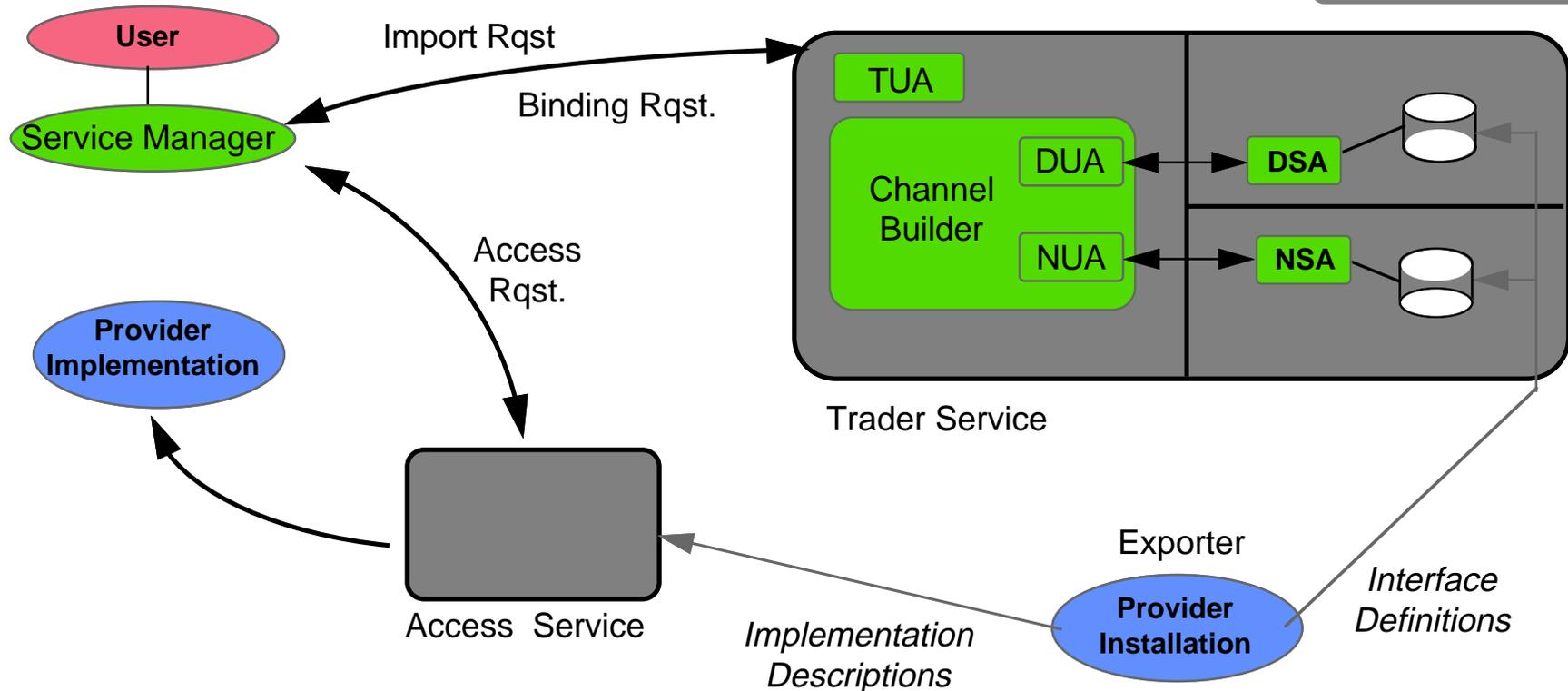
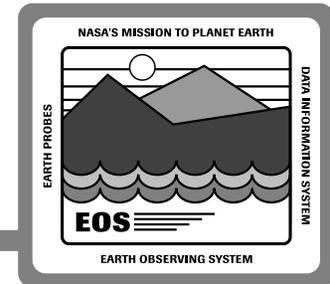
- ODP and OMG, Esprit ANSA

Interface and Server Definition Concept



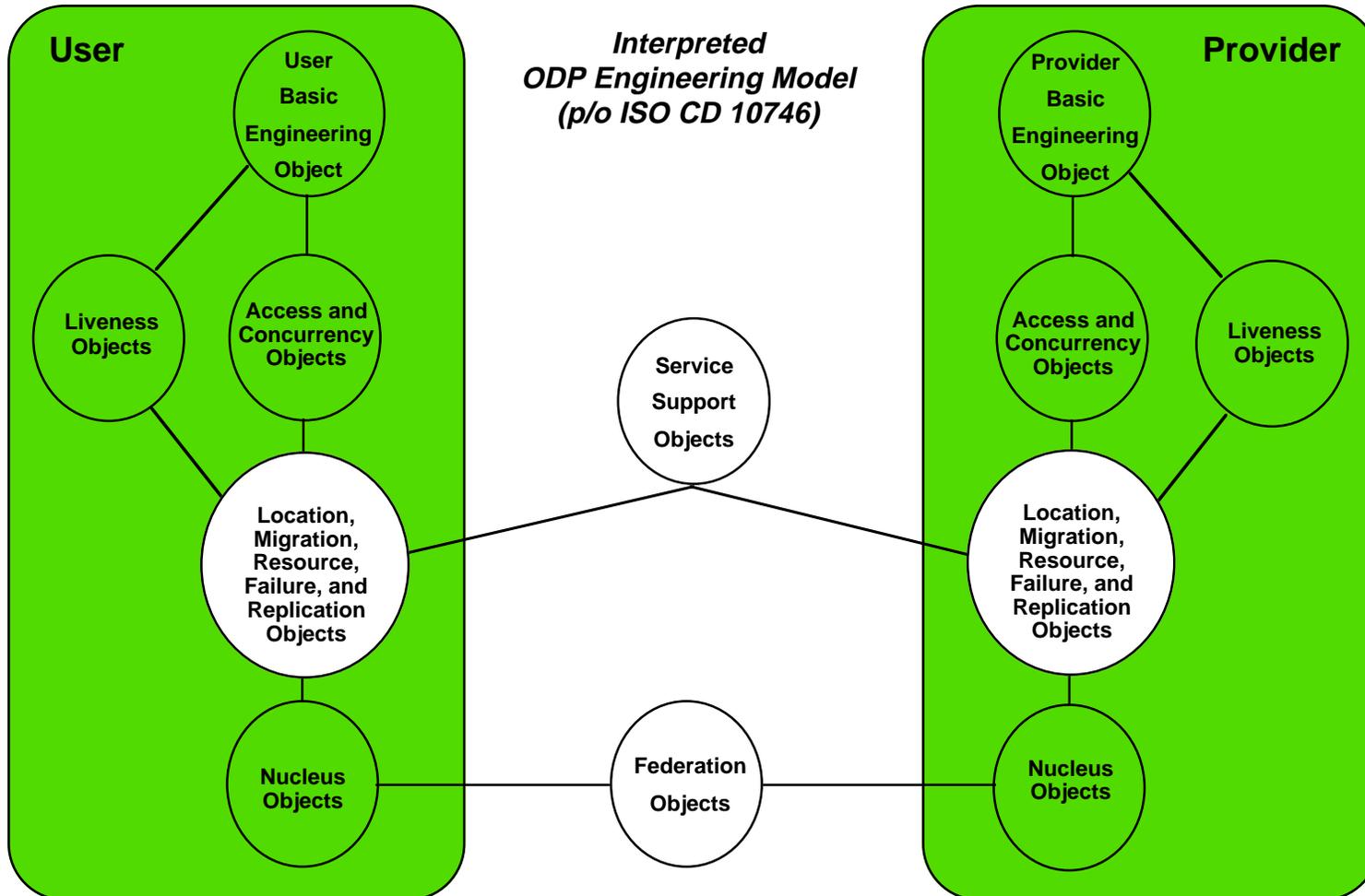
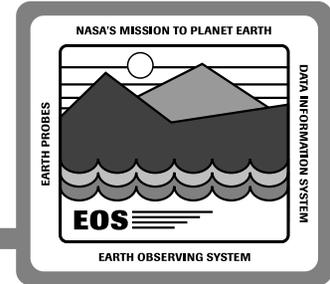
- **Infrastructural Core for Server Advertising and Naming Services**
- **Service attributes and operations are defined in an interface definition language (idl)**
- **Support for multiple vocabularies through core object model and profile extensions**

Federated Service Access Concept

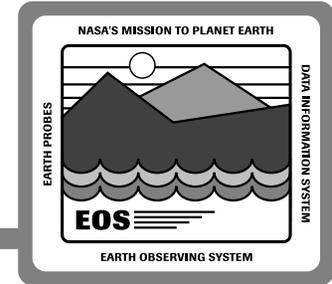


- Chaining and referral of server lookups through X.500-like service
- Interdomain access through multiple protocols
- Namespace composition through multiple naming/directory accesses
- Service instantiation at runtime with potential to alter and mix services

Interconnection Logical Architecture: Open Distributed Processing (ODP)

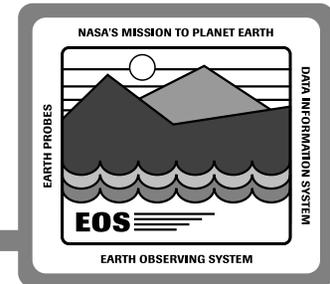


Reference Model - Open Distributed Processing (RM-ODP)



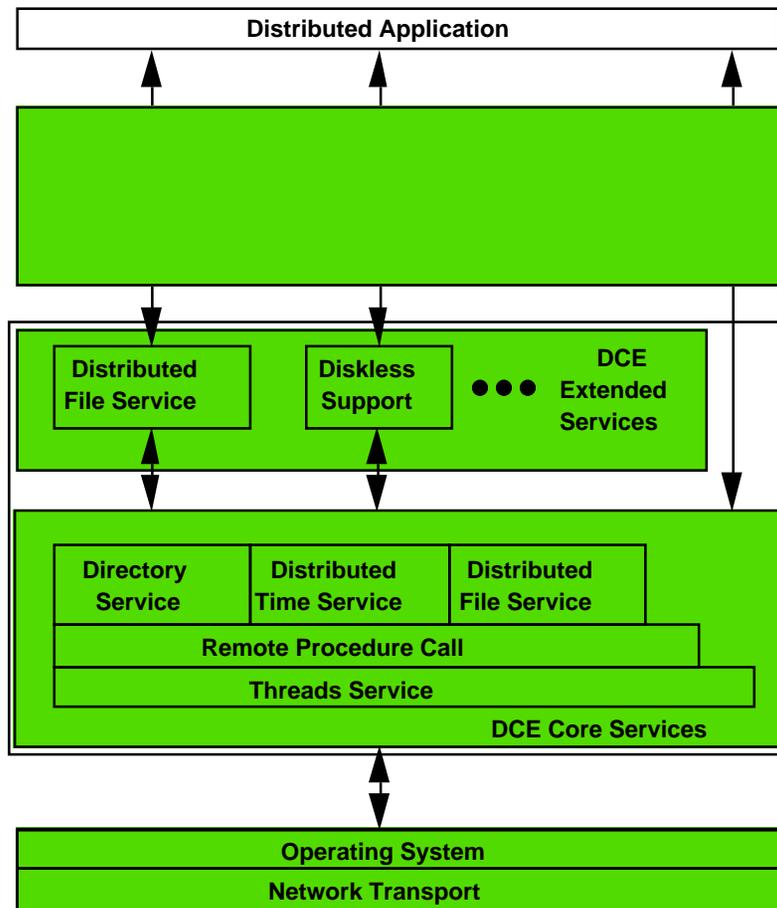
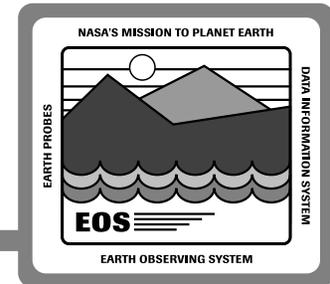
- **ANSI and ISO activity beginning in 1987**
- **1st balloting at Committee Draft (CD) level complete**
- **Conceptual framework to integrate distribution, interoperability, and portability**
- **Engineering model defines system infrastructure and relationships**
- **Formal liaison established between ODP and OMG in June 93**
- **OMG activities related to ODP**
 - **Object Management Architecture**
 - **CORBA Specification**
 - **Object Services Architecture**
 - **specific Object Services**
- **OMG should prove to be common denominator ODP implementation**

Interconnection Architecture Trade Analysis



Technology Drivers	V0	DCE	S2K	NIIT EDS	DCE w/Ext.	CORBA
Synch. Interprocessing	√	√	√	√	√	√
Asynch. Messaging	√		√	√	√	√
Static Invocation	√	√	√	√	√	√
Explicit Static Binding	√	√	√	√	√	√
Implicit Static Binding	?	√	√	√	√	√
Directory Service/Scalability	P	√	?	√		√
Naming Service/Scalability	P	F	P	P	F	F
Security Service	P	√	?	√	√	F
Object Technology	?	P	P	P	P	F
Time Synchronization	?	√	?	√	√	F
Multivendor Interoperability		√		√	√	F
O/S Transparency		√		√	√	F
Event Processing/Maturity		P	?	P	P	F
Concurrency		√		√	√	√
Internationalized Security		F			F	F
Multiple Language Support		F	?		P	F
Legacy Server Integration				√	√	F
Dynamic Invocation			√	√	√	√
Dynamic Load Balancing			P		√	
Request Brokering				P	√	√
Server Advertising/Scaling			P	P	P	F
Real Time Collaboration			√	P	P	F
Trading						?
Federation Transparency						?

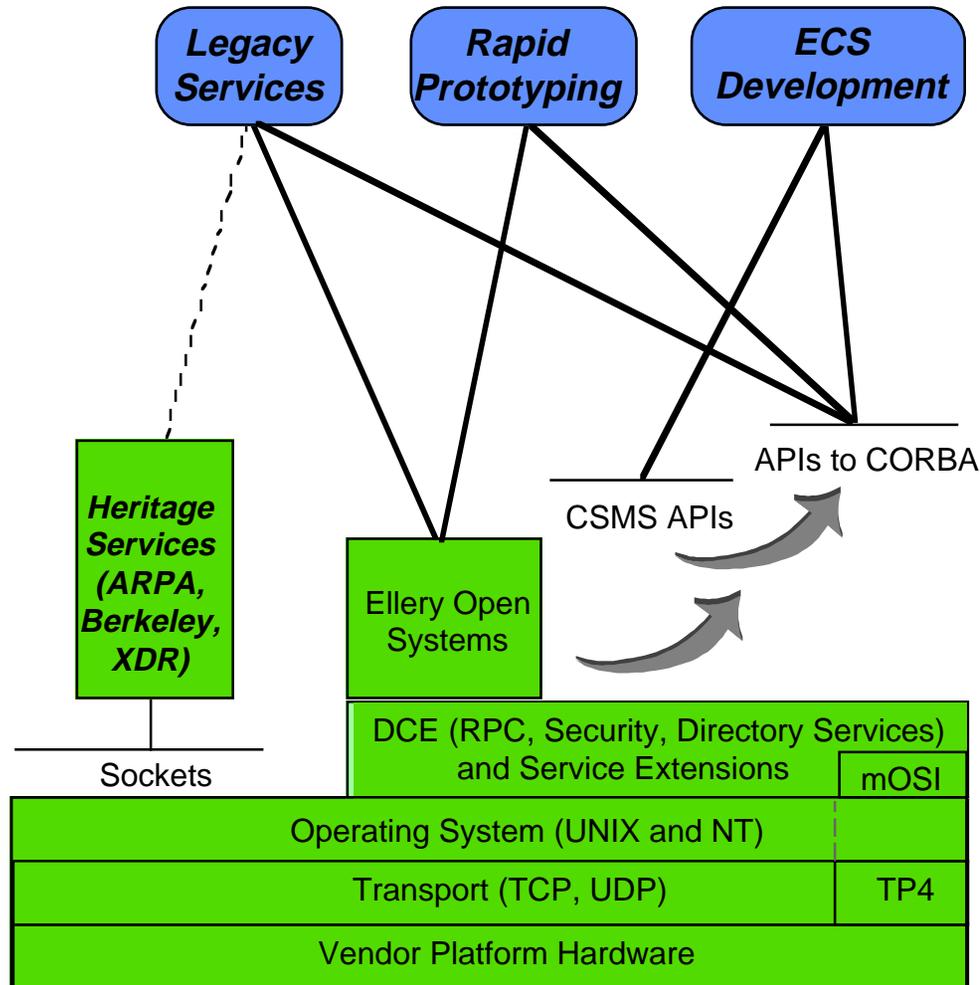
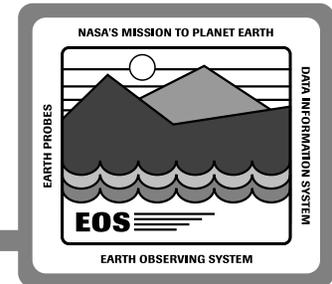
OSF DCE Components and Extensions



- Concurrency - POSIX Threads
- Communications - DCE Remote Procedure Call (RPC)
- Naming or Directory Services -
 - Intracell (LAN) - Cell Directory Service (CDS)
 - Intercell (WAN) - X.500 and DNS
- Security Services
 - Authentication (Kerberos)
 - Authorization (Access Control Lists)
 - Encryption (for privacy)
 - User/group/account management
- Time - Distributed Time Service (DTS)
- Distributed File Service (DFS)
- Diskless Support Service (DSS)

- DCE Based on ANSA Predecessor to ODP (EEC Project ESPRIT)
- DCE-Based CORBA Implementations are predominant

Interconnection Evolution Planning



- No requirement to be an Object Programmer
- Support for C, C++, ADA, Fortran, and Smalltalk

Timeline:

DCE - Now

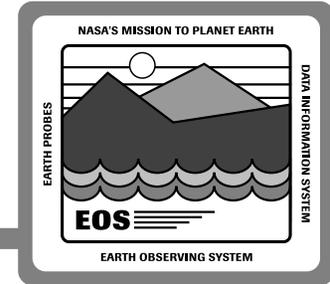
Ellery - Now

CORBA - Vendor Specific Now

Interoperable - mid 94

CORBA Object Services - mid-late 94

Interconnection Architecture Challenges/Issues



Market Acceptance of DCE

- DCE role as CORBA foundation provides pull
- Programmatic Interfaces hide DCE middleware

DCE to CORBA migration still in definition

- OSF and OMG working on issues
- Multiple Object integrations on DCE exist

Unique ORB implementations limit interoperability

- CORBA 2.0 to enhance ORB interoperability
- Enablers include XFN, OMG Object Services, COSE/UNIX work

Number/complexity of service adapters

- Convergence of ODP trader and OMG object services work
- Protocol canonicalization minimizes required interfaces

CORBA/Microsoft Object Wars

- Object bridges to OLE 2.0 built with DCE infrastructure technology